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served that these insects sometimes die off in great numbers during apparently favorable weather in summer. Sometimes indeed *all* infesting a given area seem to perish, so that the following season a collector can scarcely find one for his cabinet where there have been millions of them to the acre twelve months before. There is every appearance of a contagious disease by which they are thus swept away, and it is quite probable that the organism herein named is the true element of the contagion. It does, however, appear to be less virulent in its usual effects. It may be cultivated in meat broth.

M. gallicidus.—Cells globular, single or united in pairs; .00002 to .000029 in. in diameter; movements oscillatory only.

In the blood of the domestic fowl suffering with "chicken cholera."

While all who have studied this disease agree that the contagious element consists of minute, globular granules, capable of self-multiplication, it appears no one has named the organism nor given a description of it as a species. Dr. Salmon (Report U. S. Department of Agriculture, 1880) is inclined to attribute the origin of the granules to the direct transformation of the animal protoplasm. Readily cultivated in broth of chicken muscle.

M. suis—Cells globular, or elongated and more or less contracted in the middle, single and in pairs, rarely in chains of many articles; .000028 to .000032 in. in diameter (Detmers).

In the blood and other fluids of pigs, sick with swine plague or "hog cholera," described by Dr. H. J. Detmers (Report U. S. Department of Agriculture, 1878), under the name of *Bacillus suis*. The author, however soon after, recognizing more clearly the generic characteristics of these minute organisms, disclaimed the propriety of the classification first adopted by him. Careful studies have also been made in this country by Drs. Law and Salmon, but no name has been heretofore formally proposed except as stated. My own studies upon the organism, as such, accord with the descriptions published by the authors named and with those of Méguin of France.—*T. J. Burrill, Champaign, Ill.*

ENTOMOLOGY.[1]

INSTINCT OF THE SEVENTEEN-YEAR CICADA (CICADA SEPTENDECIM).—Talking to an observant neighbor of mine a few days ago, I learned the following facts which I thought worth sending to the NATURALIST. This neighbor informed me that his father cleared a piece of ground many years ago and left one oak tree standing about the middle of it. Twenty years or more passed by and the stumps had almost disappeared; when needing some especially tough wood he cut down this oak tree very near the ground in order to get as much of the butt as possible. Coming home one evening he took his path across this clearing where the June grass then stood knee-high, and while passing the stump of the oak tree he was astonished to find the whole place alive with some insect which, on examination, proved to be the seventeen-year Cicada. They were well down among the roots of the grass, but what struck him as very singular was the fact that in all this host the head of every one was directed toward the stump which not one of them could see or ever had seen. Returning next morning to see what had become of them he found the stump literally buried with the cast skins of, as he expressed it, "millions of locusts." His explanation of their enormous number was that at their last appearance, finding the trees cleared away under which their larval stage had been passed, they had congregated on this one surviving oak and laid their eggs about it in great quantities. But how shall the strange fact be explained that after seventeen years' interment, every insect on emergence headed straight for the tree among whose roots it had been feeding? We say it is instinct that drives the Norwegian lemmings to "go west" periodically in millions, until they are drowned in the idle attempt to swim across the Atlantic. Was it also instinct that impelled these seventeen-year Cicadas towards the invisible trunk of the tree under which they had made for so many years their subterranean home? Did the "sense of direction" lie dormant in that mite of a nervous chord through its egg-existence, and for seventeen years afterwards? I know this phenomenon is not without parallel. The young of the canker worm do the same on emergence, and would probably do it if the tree had been cut down during the winter. But they are annual insects, and climb the tree for food and the reproduction of the species. In the case given the larva had been seventeen years out of sight, and yet makes straight on emergence for the stump of a tree which it could not see. It is, therefore, in all probability not aided by the sense of smell, or that other sense, if such it be, that is supposed to reside in the antennæ of insects.

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[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., may be sent.

The faculty that carries the lemming to destruction, and the Cicada towards the stump of its ancestral tree, does not deserve the name of reason, because it disregards changed conditions, but it seems a more wonderful faculty, at least, in some of its aspects. That the infinitesimal mite of matter composing the nervous system of this insect is susceptible to outside impressions, to retain them and transmit them for the use of generations yet unborn, for their guidance; is as wonderful as any act of reason, if not more so. The young insect may be said to see with its parents' eyes, and consequently sees things as they were in its parents' lifetime. Are the impressions made upon the nerves of the parent handed down to the offspring, as some of the physical or chemical properties of the proteine compound which forms the basis of their life?

In connection with the above narrative I should like to ask if larvae of the seventeen-year Cicada living on the roots of a tree, would be destroyed by cutting down the tree and killing its roots, especially during the earlier stages of their existence.—*E. W. Claypole.*

[The facts narrated are not so wonderful as they at first appear. The trees generally having been felled only a few years prior to the previous appearance of the Cicadas, seventeen years before, these, doubtless, came out all over the piece of cleared ground, and congregated on the isolated tree that had been left, filling its branches with eggs which supplied the ground beneath the tree with an unusual quantity of young Cicadas. This isolated tree was also cut down after the new generation had nearly acquired full growth. These insects had, doubtless, during the later years of growth fed on the roots of said tree, always with the head toward the butt, or in the direction of the increasing size of the roots. They had, probably, for nearly seventeen years been directed to the same point which they made for upon issuing from the ground as pupæ. This is one explanation of the facts, though we fully recognize that there is much to us inexplicable about the sense of direction in insects. Dr. H. A. Hagen recently mentions (*Nature*, Dec. 21, 1882) a singular case of the pupa of *Ophiogomphus* making direct tracks over the sand from the water, whence it issued to a solitary willow tree 100 feet away. We believe that the destruction of the roots of the tree would prove fatal to the Cicada larvæ except where it occurred after they had reached within two or three years of their full growth.—*C. V. R.*]

FOOD-HABITS OF MEGILLA MACULATA.—In his investigations on the food of Carabidæ and Coccinellidæ, Professor S. A. Forbes records his observations, among others, on the above-named species, of which he dissected fourteen specimens. In eleven specimens, collected at various times around Normal, Ill., the food proved to consist of 46 per cent. of animal food (chiefly *Aphides*), and 34 per cent. of vegetable food, consisting of about equal proportions of pollen and spores of lichens. Three other specimens, collected in a corn-field, swarming with Chinch-bugs, had eaten only 13 per cent. of animal food (all insects, but no Chinch bugs among them), the rest being vegetable food and almost exclusively spores of fungi.

While these investigations tend to show that our Megilla is more phytophagous than entomophagous, at least in certain localities, yet the fact of its food consisting of fungi and pollen does not renders the species injurious to agriculture. What we stated on this last subject in the NATURALIST for April, 1881, p. 326, rested solely on a communication from one of our correspondents, Mr. George B. P. Taylor, of St. Inigoes, Md. Our efforts to verify Mr. Taylor's statement by experiments in vivaria gave negative results, the beetles refusing to eat tender leaves of corn, grapevine, melon, morning-glory and clover. From these experiments and from Professor Forbes's investigations, we might feel inclined to doubt the correctness of Mr. Taylor's statement were it not for some field observations made last year by Mr. Theodore Pergande which tend to confirm those made by Mr. Taylor.

Mr. Pergande, while searching for injurious insects on corn in the vicinity of Washington, on August 22d, saw several imagos and larvæ of this species, actually eating into the soft kernels of the ears. The beetles were almost entirely within the nearly empty kernels, and it could plainly be observed that they were eating. Upon removing them the most careful examination failed to discover any other insect in the kernel. The larvæ were found in similar situations actively engaged in eating the substance of the soft seeds.

CLOTHES MOTHS OBSERVED IN THE UNITED STATES.—There has always been confusion and uncertainty in referring to the correct names of the clothes moths found in this country, and we are glad to note the fact that Professor C. H. Fernald, in the *Canadian Entomologist* for September, 1882, pp. 166–169, has given us a concise account of our species based upon a large collection brought together from all parts of the country and sent to Lord Walsingham for comparison with European species. It appears that we have no native clothes moths, the three species observed in this country being identical with European species. They are as follows: 1st. *Tinea pellionella* Linn., the case-making and most destructive species; 2nd., *Tinea tapetzella* L.; the gallery-making species, rare in this country; 3rd., *Tinea biselliella* Hummel, which is also not a case-making species. The intricate synonymy of the first and third species which have been redescribed by American authors under several names is given in full by Professor Fernald who also describes the imagos and gives some biological notes on the species.

LEPIDOPTEROUS LARVÆ AND YELLOW FLOWERS.—The larvæ of *Heliothis armigera* seems to have a partiality for yellow flowers. I found some feeding on the flowers of the evening primrose at Biarritz in October, last year; failing that, they readily took to honeysuckle flowers. When I brought them to England and offered them a choice of chrysanthemums (the only flower I had at the time), they preferred the yellow ones, and throve upon them. One day I gave them a red chrysanthemum, and they would not eat that, but ate one of their number; they had shown no tendency to cannibalism on the journey when the honeysuckle was not fresh.—*M. S. Jenkyns, in the Entomologist* (*London*), *January, 1883* (*vol. xvi., p. 23*).

NOTE ON MUTILLA *(occidentalis* L.*)*.—From early boyhood I have occasionally seen this insect, but perhaps in all—in over fifty years—not more than fifteen or twenty of those of large size. They are known as "cow-killers" or "cow-stingers," and in children excite more or less fear. I have often wondered why they were called "cow-killers;" having till the past summer never heard of any animal or person being injured by them. A cow, however, eating grass, and with the nose pressing one of them would probably be stung very severely. The sting, long, black and sharp, can be protruded almost the length of the whole body. Last summer I met with two persons who had been stung by the Mutilla—one, a negro man, who was stung when a cow-boy in Virginia; the other, now owner of Ballew's Creek Mills, in Forsyth Co., when a boy was riding under a dogwood bush, and knocked off one which fell into his shoe. The pain from the sting was great, the foot swelled, and he was lamed for a few days; but in neither of the cases were the symptoms alarming.

This insect is remarkably tough—difficult to kill. Unless the ground is very hard, it may be trodden upon with the boot, and rubbed and scrubbed into the earth, and yet when the foot is removed it will work itself out and run off apparently unhurt. Its whole envelope has the toughness of leather. The specimens sent are evidently larger than the *M. europæa.*—*Nereus Mendenhall, M. D., Westminster, Guilford Co., N. C.*

ZOÖLOGY.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK.—This Society, which has been in existence for several years, issued in December, 1882, its first volume of Transactions in royal octavo form of 168 pages, and is unexceptionable as regards paper and presswork. The spirit of the papers making up the text is excellent, as they are based on extensive and painstaking field work. The first article is the longest, it is devoted to a fresh and valuable account of the mammals of the Adirondack region, a work which we have noticed in another place. The second article, by Mr. Wm. Dutcher, is entitled "Is not the fish crow (*Corvus ossifragus* Wilson) a winter as well as a summer resident at the northern limit of its range?" He answers the question in the affirmative, the evidence tending strongly to show that the bird is a permanent winter resident in its northern habitat, instead of a rare summer visitor. The third and last article is "A review of the summer birds of a part of the Catskill mountains, with prefatory remarks on the faunal and floral features of the region." By E. P. Bicknell. Some of the mammals and all the batrachians and reptiles noticed in the Catskills are enumerated. The author does not accept the claim that two efts, *Diemyctylus miniatus* and *viridescens* are identical, as claimed by a writer in this journal (xii, 399). The paper is an interesting and comprehensive sketch of the natural history of a beautiful mountain region.

REMARKS ON THE DISTRIBUTION OF MARGARITANA MARGARITIFERA (LINN).—Already much has been said in the pages of the NATURALIST in regard to this species, yet a fuller exposé of its east-